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The Attentional Function Index—a self-report cognitive measure

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Abstract

***Objective*: Cognitive assessment in individuals with cancer requires both measured performance on neuropsychological tests and self-report of effectiveness in functioning. Few instruments are available to assess the perceived impact of cognitive alterations on daily functioning in individuals treated for cancer. In this study, we investigated the psychometric properties of a theoretically based instrument, and the Attentional Function Index (AFI), designed to measure perceived effectiveness in common activities requiring attention and working memory, particularly the ability to formulate plans, carry out tasks, and function effectively in daily life.**

***Methods*: Women ($N = 172$), ages 27–86 years, completed the questionnaire before primary treatment for early stage breast cancer. Construct validity was established using exploratory principal component factor analysis with varimax rotation.**

***Results*: A 13-item instrument emerged with 3 subscales, namely effective action, attentional lapses, and interpersonal effectiveness, which explained 74.69% of total variance. The internal consistency coefficients (Cronbach's α) were 0.92 for the total instrument, and ranged from 0.80 to 0.92 for the 3 subscales. Further examination of validity indicated that the scores on the AFI (1) showed expected correlations with established measures of ability to concentrate, cognitive failures, states of confusion, and mental fatigue, and (2) could distinguish differences in perceived cognitive functioning between younger and older age groups. AFI scores were not significantly associated with years of education or presence of comorbid conditions.**

***Conclusion*: The brief AFI has demonstrated usefulness for assessment of perceived cognitive functioning in populations with life-threatening and chronic illness, such as breast cancer.**

Keywords: cancer; oncology; cognitive function; measurement; instrument

Introduction

Most recent research has focused on assessing alterations in cognitive function in cancer survivors. In particular, a growing body of clinical research has examined the effects of cancer and cancer therapies on cognitive function [1–3]. To date, neuropsychological testing has found deficits in a variety of cognitive domains. Of these, alterations in basic cognitive functions of attention and working memory have been consistently reported in persons having a variety of malignancies and cancer treatments [1–3]. Presently, there are numerous established neuropsychological batteries available for assessment of attention and working memory. In contrast, few instruments exist that are aimed specifically at assessing subjective perceptions, or self-reports, of effectiveness in activities of daily living, supported by these basic cognitive processes. Such subjective assessments are needed to better understand the detrimental effects of these cognitive problems on key aspects of daily functioning.

The purpose of this report is to describe the development and testing of an instrument, the Attentional Function Index (AFI), designed to assess perceived effectiveness in daily activities supported by attention and working memory. The instrument was first developed to assess the detrimental effects of cognitive or mental fatigue on daily functioning in women treated for breast cancer. Since then, other researchers have used the AFI as a self-report of cognitive functioning in a variety of populations and conditions, including healthy individuals and individuals with breast and lung cancer (Table 1). This paper reviews the theoretical basis and development of the AFI and examines its construct validity and reliability. The ultimate purpose is to make this instrument available for use by researchers and clinicians.

Theoretical perspective

Selective attention is a basic cognitive capacity that allows increased sensitivity to important

Table I. Studies using the Attentional Function Index

Reference	Population				Reliability coefficient
	No. of subjects	Gender	Age	Sample	
Cimprich [4,5]	32	F	Range: 29–84 years (M = 54 years)	Breast cancer	0.89–0.94
Cimprich *et al.* [6]	184	F	Range: 27–86 years (M = 55 years)	Breast cancer	0.91
Cimprich [7]	74	F	Range: 25–79 years (M = 56 years)	Breast cancer	0.92
Jansen [8]	54	M and F	Range: 65–87 years (M = 55 years)	Community-dwelling elders	0.93
Lee [a][9]	125	F	Range: 30–69 years (M = not reported)	Breast cancer/chemotherapy	0.90
Lehto [10]	42	M and F	Range: 37–83 years (M = 64 years)	Lung cancer and other lung diseases	0.87–0.92
Lehto and Cimprich [11]	45	F	Range: 25–75 years (M = 55 years)	Breast cancer	0.92
Lethbridge *et al.* [12]	33	M and F	Range: not reported (M = 19 years)	Nursing students	0.85
Sanders *et al.* [13]	32	M and F	Range: 23–52 years (M = 38 years)	Nursing students	0.83
Stark [14]	57	F	Range: 22–42 years (M = 29 years)	Pregnant women	0.88–0.94
Stark [15]	126	F	Range: not reported (M = 29 years)	Pregnant women	0.89–0.99
Tennessen and Cimprich [16]	72	F	Range: 18–25 years (M = 20 years)	University students	0.84

[a]AFI translated into Korean.

environmental stimuli, so that an individual can efficiently process information and engage in purposeful behavior [17–19]. According to current cognitive neuroscience theory, selective attention is essential for the integrity of higher-order cognitive and social-affective functions (Smith and Jonides, 1999, for a review [20]). An important form of selective attention, directed or controlled, is driven by personal intentions and is characterized by an ability to actively focus on some information while ignoring other information in the environment and to maintain focus on such information for more than a few seconds at a time [17,18,21]. Directed attention requires mental effort to actively inhibit or block distractions that may capture one's interest, but are irrelevant to completing an activity or goal-directed task [17,21]. A close functional connection between selective attention and working memory is widely recognized, and both systems are integral components of effective cognitive functioning [20,22]. Thus, problems of working memory are often related to losses in the capacity to direct attention.

Selective attention provides inhibitory control for many aspects of cognitive functioning and behavior, including working memory and higher order cognitive or 'executive' functions that are needed for problem-solving and effective social functioning. Muriel Lezak first described executive functions as those cognitive processes that determine how something gets done or whether it gets done at all [23]. Specifically, the following components of executive functioning have been identified: (1) establishing goals; (2) formulating and carrying out plans; (3) initiating and maintaining an intended activity so that important goals can be achieved; and (4) effective interpersonal functioning, including self-monitoring of behavior, acting at an appropriate time (patience and deliberate responses), and modifying behavior to meet goals [18,23,24].

Research has shown that attention can be compromised by fatigue, insomnia, and possible toxic side effects of cancer treatment, such as chemotherapy, immunotherapy, or brain radiation [7,25–29]. The hallmark of compromised attention is increased distraction, experienced as an inability to concentrate. When attention is compromised over time, a person experiences a loss of effectiveness in executive functioning that can lead to a decreased sense of personal efficacy, irritability, impulsivity, and mental confusion [4,21].

Few instruments exist that may provide an insight into the loss of personal effectiveness that may accompany cognitive dysfunction associated with life-threatening and chronic illness, such as cancer. Furthermore, few instruments have been designed to assess specific functional consequences of losses in basic cognitive systems of attention and working memory in a cancer population.

Development of the AFI

The AFI was developed to assess perceptions of effectiveness in daily life activities that require directed or controlled attention and the higher executive processes served by this basic cognitive system. Face validity and theoretical congruence was first established by a panel of experts that included researchers and theorists in cognitive psychology, neurobehavior, and cognitive neuroscience. Content validity of the AFI was originally examined using nonparametric factor analysis and a four-factor solution was identified [24]. The four factors identified were congruent with the theoretical constructs of directed attention and executive functions, and included subscales of effective actions, perceptual effectiveness, lapses in attention, and interpersonal effectiveness [24]. The AFI is described below, including items, response format, time period of assessment, positive/negative

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wording of items, and studies that have used the AFI.

Items

The AFI was originally designed with 16 items [4,5,24]. The first 12 items were derived from Lezak's 4 components of executive functioning, including: goal formulation, planning, carrying out activities, and monitoring effective performance. The last four items of the AFI were formulated to assess behavioral and affective responses associated with a lowered capacity to direct attention, including making mistakes, forgetting, irritability, and impatience. Because some individuals may experience discomfort when responding to items describing attentional difficulties, those questions were placed at the end of the instrument to allow for a clearer response [30].

Response format

The visual analogue scale format was chosen to precisely measure the individual's perceptions of how well they are currently functioning. Each of the items consists of a 100 mm horizontal line anchored with opposite phrases from *not at all* (0 mm) to *extremely well* or *a great deal* (100 mm). Subjects are asked to place a mark on the line that best describes functioning in relation to the specific activity. Scores for each item are determined by measuring the distance from the lower end of the scale in millimeters. The total score on the instrument is computed by obtaining an average of the 16 scales. The visual analogue scale format has multiple advantages, including that it is easy to use, sensitive to detecting small changes over time, and has similar reliability and validity to more complex measures [30]. The AFI can be easily administered and takes approximately 5 min to complete. A recognized limitation of this format is that scoring can take longer than other response formats.

Time period of assessment

The AFI measures an individual's perceived effectiveness in functioning at the *time of administration, i.e. the present time*. An individual's capacity to function effectively is dynamic and fluctuates over time based on the strength of attention. The goal of the AFI is to measure a temporary state and not underlying traits of the individual. Thus, the AFI is particularly well suited for longitudinal assessment of changes in perceived effectiveness of activities requiring attention.

Positive and negative wording

The first 12 items are worded in a positive direction (higher scores mean better performance) and the last 4 items are reversed. This format reduces possible confusion in responding as well as response biases favoring either no difficulties or a great deal of difficulties in activities supported by attention. The AFI gives respondents new instructions before reversing the direction of the questions in order to cue respondents on a change in format. This instrument has been well accepted by respondents, and interitem correlations suggest that respondents are able to accurately read and respond to the items worded in both positive and negative directions.

Groups studied

The original 16-item AFI has been used in a variety of populations, including both men and women ranging in age from 22 to 84 years. It also has been translated into Korean (Table 1). The internal consistency coefficient (Cronbach's α) of the 16-item AFI has been consistently satisfactory, ranging from 0.76 to 0.94. (See Table 1 for the Cronbach's α of individual studies that have used the AFI.) The instrument has been used along with objective neuropsychological measures of cognitive function to describe both changes in performance and perceived cognitive function in various samples, indicating the need for such a theory-based instrument. However, except for the original nonparametric analysis of construct validity in a small sample of women newly diagnosed with breast cancer, no further work has been done to confirm the psychometric properties of the AFI in relation to validity. Thus, the objective of this study was to test the reliability and validity of the instrument with a larger sample of women newly diagnosed with breast cancer.

Method

Participants

The sample consisted of 172 women, newly diagnosed with breast cancer recruited from a pool of women, seeking breast cancer treatment at a comprehensive cancer center. The participants ranged in age from 27 to 86 with a mean age of 54 years. Participants were predominantly White (90%) and relatively well educated with 82% having had at least some college education. A majority were post-menopausal (66%) by self-report and had a clinical diagnosis of Stage I breast cancer (56%). Individuals were excluded if they had a history of psychiatric or neurological disorder, were taking psychoactive medications, or had insufficient command of the English language. (See Table 2 for a more detailed description of sample characteristics.)

Procedure

The University's Institutional Review Board for Medicine approved the study. Following written consent, participants were assessed with a small

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battery of measures, including the AFI, during a scheduled pre-treatment clinic visit in a quiet, private room in the ambulatory care area. Testing occurred about 22 days following diagnosis by biopsy and about 17 days before primary surgery for breast cancer. Participants were recruited only after having been informed of the clinical diagnosis and having decided on the primary treatment plan.

Table 2. Demographic and medical characteristic of sample

Characteristics	Total sample ($N = 172$)	
	N	%
Education		
High school or less[a]	31	18.0
College[b]	141	82.0
Race		
Hispanic	3	1.7
Caucasian	155	90.2
African-American	14	8.1
Menopausal state		
Premenopausal	49	28.5
Perimenopausal	9	5.2
Postmenopausal	114	66.3
Comorbid conditions[c]		
No	89	52.0
Yes	82	48.0
Stage of disease[d]		
Stage 0	15	8.8
Stage I	96	56.5
Stage II	56	32.9
Stages III and IV	3	1.8

[a]Includes grade school, some high school, and high school diploma.
[b]Includes some college, undergraduate degree, some graduate work, graduate degrees, and other schooling.
[c]Missing data on one subject.
[d]Missing data on two subjects.

Data analysis

Demographic and medical characteristics of the sample were determined by descriptive statistics. To determine conceptual redundancy, correlational analysis was used to examine interitem relationships. Construct validity of the AFI was examined using principal component factor analysis with varimax rotation; and this led to a revised instrument. The reliability of the revised instrument was determined by Cronbach's α. Further correlational analyses were conducted to establish convergent and divergent validity of the revised instrument with similar and contrasting measures, respectively.

Results

The scores for each item on the AFI are described in Table 3. The scores on the last four items were reversed so that higher scores indicated better perceived functioning. The scores on items ranged from 0 to 100, suggesting good variance, with participants' responses ranging from poor to satisfactory in perceived cognitive functioning before primary treatment for breast cancer.

Analysis of interitem correlations

An examination of interitem correlations showed that three items were highly correlated ($r \geqslant 0.80$) with other items. Further examination indicated

Table 3. Original AFI scale and item analysis

AFI scale (16-item)			Item information			
M	SD	Reliability	Item	*M*	SD	Range[a]
65.51	18.03	0.94	Getting started on activities	62.40	25.24	9–100
			Planning your daily activities	68.22	23.31	11–100
			Following through on plans	66.56	24.76	10–100
			Doing things that take time and effort	65.28	24.76	6–100
			Making mind up about things	64.41	24.35	3–100
			Finishing things you have started	68.59	22.28	6–100
			Keeping mind on what you are doing	63.77	25.02	5–100
			Remembering to do the things you started out to do	61.23	24.90	7–100
			Keeping track of what you are saying and doing	62.25	25.17	3–100
			Keeping mind on what others are saying	62.26	24.52	5-100
			Keeping self from saying or doing things	73.02	21.82	11–100
			Being patient with others	69.77	24.10	5–100
			How hard you find it to concentrate on details[b]	61.19	27.33	0–100
			How often you make mistakes[b]	65.74	24.66	0–100
			Forgetting important things[b]	69.97	24.34	1–100
			Getting easily annoyed/irritated[b]	63.44	27.14	0–100

[a]Possible range of scores for scale is 0–100.
[b]Data for reversed items transformed.

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that the three items, *planning your daily activities*, *finishing things you have started*, and *keeping track of what you are saying and doing*, were conceptually redundant with other items and so were deleted from the instrument to reduce inflation of the internal consistency coefficient. This resulted in a 13-item instrument. A fourth item, *getting easily annoyed or irritated*, was found to have low correlations with other items ($r \leqslant 0.30$) but was deemed to be conceptually important, particularly as an affective response to declines in attentional functioning. Thus, in the following analysis of construct validity, the instrument was examined both with and without this item.

Construct validity of the AFI

Factor analysis, specifically exploratory principal component analysis, was used to determine construct validity and the best factor solution for the reduced 13-item instrument. Findings indicated a significant Bartlett's test [χ^2 (78, $N = 172$) = 1581.94, $p = < 0.001$], a Kaiser–Meyer–Olkin (KMO) measure of 0.89, and item communalities > 0.60. A second factor analysis of the 12-item instrument (without the item 'getting easily annoyed or irritated') produced similar results with a significant Bartlett's test [χ^2 (66, $N = 172$) = 1439.35, $p = < 0.001$], a KMO measure of 0.90, and item communalities > 0.60. Thus, this item was retained in the scale and the 13-item AFI was accepted for further subscale analysis as detailed below.

Factors for the 13-item AFI were evaluated on both eigenvalues and the scree plot. Three factors were extracted based on the following criteria: (1) eigenvalues greater than 1.00, and (2) factor loadings of $\geqslant 0.40$. (Factor patterns are shown in Table 4.) The factors were named Effective Action, Attentional Lapses, and Interpersonal Effectiveness. As shown in Table 4, three items are loaded on more than one factor. Two items, *remembering to do all the things you started out to do* and *keeping your mind on what others are saying*, have a strong conceptual link with Factor 1, Effective Action, and thus were retained in this subscale. The third item, *getting easily annoyed or irritated*, is conceptually consistent with Factor 3, Interpersonal Effectiveness, and was retained in this factor.

In summary, factor analysis indicated that the 13-item scale containing three subscales reflected theoretical congruence with the constructs of directed attention and executive functioning. Factor 1, Effective Action, contained 7 items assessing an individual's perceived effectiveness in carrying out basic activities in daily living that require focused attention. This factor integrated items from the original subscales of perceptual effectiveness and effective actions. Factor 2, Attentional Lapses, contained 3 items measuring perceived difficulties in directing attention in daily tasks. Finally, Factor 3, Interpersonal Effectiveness, contained 3 items reflecting perceived ability to interact in a deliberate manner that depends on attentional or inhibitory effort. The three factor solution makes conceptual sense. The total variance explained by these three factors was 74.69%. (See Tables 5 and 6 for descriptive scores of the revised AFI and the three subscales, and the Appendix for a copy of the instrument.) The revised 13-item AFI was further examined for reliability and convergent and divergent forms of validity, and the findings are presented below.

Reliability of the revised AFI

The internal consistency coefficient (Cronbach's α) for the revised 13-item scale was 0.92, indicating satisfactory reliability. The revised AFI demonstrated strong item-total correlations, indicating a good ability to discriminate between high and low scores [31] (Table 5). The reliabilities of the new

Table 4. Modified 13-item AFI factor loadings using principal component analysis with varimax rotation

Scale	Factor 1: effective action	Factor 2: attentional lapses	Factor 3: interpersonal effectiveness
Getting started on activities you intend to do	0.87		
Following through on your plans	0.87		
Doing things that take time and effort	0.83		
Keeping your mind on what you are doing	0.73		
Making your mind up about things	0.72		
Remembering to do all the things you started out to do	0.65		0.47
Keeping your mind on what others are saying	0.56		0.52
How often you make mistakes on what you are doing		0.85	
Forgetting to do important things		0.85	
How hard you find it to concentrate on details		0.75	
Being patient with others			0.88
Keeping self from saying or doing things			0.80
Getting easily annoyed or irritated		0.58	0.61

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Table 5. Descriptive analysis of the revised AFI

Revised AFI scale (13-item)			Item information				
M	SD	Reliability	Item	*M*	SD	r^a	Range[b]
65.31	17.95	0.92	Getting started on activities	62.40	25.24	0.66	9–100
			Following through on plans	66.56	24.76	0.70	10–100
			Doing things that take time and effort	65.28	24.76	0.69	6–100
			Making mind up about things	64.41	24.35	0.72	3–100
			Keeping mind on what you are doing	63.77	25.02	0.73	5–100
			Remembering to do things you started out to do	61.23	24.90	0.77	7–100
			Keeping mind on what others saying	62.26	24.52	0.74	5–100
			Keeping self from saying or doing things	73.02	21.82	0.60	11–100
			Being patient with others	69.77	24.10	0.62	5–100
			How hard you find it to concentrate on details[c]	61.19	27.33	0.67	0–100
			How often you make mistakes[c]	65.74	24.66	0.65	0–100
			Forgetting important things[c]	69.97	24.34	0.65	0–100
			Getting easily annoyed/irritated[c]	63.44	27.14	0.47	1–100

[a]The corrected item-total correlation.
[b]Possible range of scores for scale is 0–100.
[c]Data for reversed items transformed.

Table 6. Mean, standard deviation, and internal reliabilities for the three newly derived subscales

New subscale	Mean	Standard deviation	Internal reliability Cronbach's α
Factor 1: effective action (7 items)	63.70	20.48	0.92
Factor 2: attentional lapses (3 items)	65.63	22.72	0.87
Factor 3: interpersonal effectiveness (3 items)	68.74	20.66	0.80

subscales are satisfactory and are described in Table 6.

Convergent validity of the revised AFI

Convergent validity was tested by (1) assessing the correlation between the total scores of the revised AFI and the scores on the concentration item in the Symptom Distress Scale (SDS) (developed by McCorkle and Young [32]), which is widely used in cancer populations, and (2) assessing the correlation between the total scores on the revised AFI and the total scores on the Cognitive Failures Questionnaire (CFQ) [33]. Scores on the concentration item in the SDS scale range from 1 (no problem) to 5 (worst possible problem) at the present time. The CFQ consists of 25 items that measure participants' perceived failures in perception, memory, and motor function, which are deemed to be associated with attentional control. The CFQ scale has a range from 0 (no reported mistakes during the past few weeks) to 4 (made mistakes very often during the past few weeks).

A significant negative correlation was found between the revised AFI total scores and scores on the concentration item ($r = -0.58$, $p < 0.01$), indicating that higher overall effectiveness in perceived attentional functioning was associated with less difficulty concentrating. Similar results were found when assessing the correlation between the total scores of the revised AFI and the CFQ. A significant negative correlation was found between the revised AFI total scores and scores on the CFQ ($r = -0.60$, $p < 0.01$). This finding suggests that as the perceived attention function scores improved, reported cognitive failures decreased.

Divergent validity of the revised AFI

Divergent validity of the 13-item AFI was tested by (1) assessing the correlation between total scores on the revised AFI and total scores on the Confusion subscale of the Profile of Moods States—Short Form (POMS-SF) [34], and (2) assessing the predictive validity of the AFI for self-ratings of mental and physical fatigue using related items on the SDS. The confusion subscale included the following five items: confused, muddled, bewildered, efficient, and forgetful. Each item was scored from 0 (have not at all been feeling this way in the past week) to 4 (have extremely been feeling this way in the past week), with reverse coding of the efficient item. As expected, a significant negative correlation was found between the AFI total scores and scores on the Confusion subscale ($r = -0.59$, $p < 0.01$). This finding suggests that as AFI scores increased (with better perceived attentional function), feelings of confusion decreased.

A multiple regression analysis indicated a significant [$F(3, 167) = 33.27$, $p < .001$] predictive relationship between total AFI scores on the

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revised instrument and scores on the SDS item of mental fatigue. Specifically, increased AFI scores (indicating better attentional function) were associated with lower scores for mental tiredness. At the same time, AFI scores were not significantly related to scores on the SDS item of physical fatigue, suggesting that scores on the revised AFI cannot predict experience of physical fatigue. Thus, the total score on the revised AFI instrument seems to predict mental fatigue but not physical fatigue, which suggests that the instrument may be capable of discriminating between mental or cognitive fatigue and physical states of fatigue.

Possible covariates

Certain demographic characteristics should be considered when assessing cognitive function. Specifically, increased age, fewer years of education, and the presence of chronic illnesses have been associated with lower scores on objective measures of cognitive functioning [6]. As such, the relationships between perceived attentional function and age, education, and presence of chronic health problems were examined. Age was found to have a significant positive relationship with total scores on the revised AFI (Pearson's $r = 0.21$, $p = 0.01$). Thus, younger women reported lower attentional functioning and older women reported higher attentional functioning. Interestingly, although this finding is inconsistent with those associated with objective measures of cognitive functioning, it may suggest that younger women react to small changes in the level of their functioning, while older women may have adapted to lower expectations of effectiveness in daily functioning related to normal aging. Years of education was not significantly correlated with scores on the revised AFI (Pearson's $r = -0.01$, $p = 0.94$). Thus, years of education were not associated with perceived cognitive functioning. Finally, the sample was divided into two groups, those reporting a stable chronic illness, such as hypertension, heart disease, or diabetes ($n = 82$), and those without ($n = 89$). No differences were found in total revised AFI scores based on presence or absence of a chronic illness ($t = -0.02$, $p = 0.98$). In summary, although age, education, and chronic illness are associated with scores on objective performance measures of cognitive function, only age was significantly related to scores on the AFI.

This study examined the AFI in a sample of women newly diagnosed with breast cancer. Possible differences in responses based on gender were not assessed. Although the original AFI has been used with both men and women, continued research is needed to examine possible response differences between genders.

Discussion

The results of this study demonstrate the validity and reliability of the AFI, a theoretically based instrument designed to assess perceived effectiveness in purposeful daily activities that rely on basic cognitive processes. In particular, the AFI assesses perceived changes in attention, working memory, and higher-level executive functions, including setting goals, planning and carrying out tasks, and monitoring behavior to meet intended goals. In addition, the AFI provides assessment of perceived losses in the capacity to direct attention.

The original 16-item instrument was revised based on factor analysis to reduce unnecessary redundancy and increase the precision of its psychometric properties. The resulting 13-item instrument has three distinct subscales that are theoretically congruent with changes in attentional functioning, namely effective action, attentional lapses, and interpersonal effectiveness. While use of the subscales may be appropriate at times, from a theoretical point of view, the use of the total score provides an overall index of the effectiveness of the construct of attentional functioning. Furthermore, the revised instrument showed good internal consistency with theoretically congruent findings on tests of convergent and divergent validity.

Overall, the findings indicate that the AFI is a valid and reliable measure for assessing the perceived detrimental effects of cognitive dysfunction, particularly alterations in attention and working memory on daily activities in chronic and life-threatening illness, such as breast cancer. To date, few measures have been available to assess subjective perceptions of effectiveness in activities of daily living that are supported by basic cognitive functions. The original AFI has been used with both healthy and ill populations to examine the impact of perceived cognitive alterations on the ability to carry out everyday activities. The new revised AFI has demonstrated further usefulness for research studies examining cognitive dysfunction, particularly problems of attention and working memory in persons with chronic illnesses, such as breast cancer. In particular, the instrument can be useful in future research to better understand how patient-reported functional outcomes and perceived effectiveness in everyday activities correlate to actual performance on neuropsychological tests. Such information is currently lacking and is especially needed to support development of targeted interventions to improve cognitive functioning in individuals with cancer. Last, the findings provide the needed foundation for further testing of the validity and reliability of the AFI in various healthy and ill populations.

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Appendix

I. At this time, how well do you feel you are functioning in each of the areas below?
Place a mark through the line at whatever point best describes how you are doing in each area at present.

1. Getting started on activities (tasks, jobs) you intend to do.
   Not at all _____ Extremely well
2. Following through on your plans.
   Not at all _____ Extremely well
3. Doing things that take time and effort.
   Not at all _____ Extremely well
4. Making your mind up about things.
   Not at all _____ Extremely well
5. Keeping your mind on what you are doing.
   Not at all _____ Extremely well
6. Remembering to do all the things you started out to do.
   Not at all _____ Extremely well
7. Keeping your mind on what others are saying.
   Not at all _____ Extremely well
8. Keeping yourself from saying or doing things you did not want to say or do.
   Not at all _____ Extremely well
9. Being patient with others.
   Not at all _____ Extremely well

II. **At this time, how would you rate yourself on:**

10. How hard you find it to concentrate on details.
    Not at all _____ A great deal
11. How often you make mistakes on what you are doing.
    Not at all _____ A great deal
12. Forgetting to do important things.
    Not at all _____ A great deal
13. Getting easily annoyed or irritated.
    Not at all _____ A great deal

Note : Lines are not printed to 100 mm scale.

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